

MASSACHUSETTS STATE  
AGRICULTURAL EXPERIMENT STATION.

BULLETIN NO. 48.

*JUNE, 1893.*

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METEOROLOGICAL SUMMARY

MAY AND JUNE, 1892-1893.

	May. 1892.	May. 1893.	June. 1892.	June. 1893.
Mean temperature,	55.00	55.74	68.77	66.53
Highest temperature,	81.00	84.00	95.00	93.00
Lowest temperature,	30.00	31.00	40.00	43.00
Mean range,	20.14	23.36	21.60	22.73
Total precipitation, (inches)	5.49	4.37	3.04	2.86
Prevailing wind,	S.	N.W.	S.	N.

The mean temperature, for the month of May, '93, viz 55.74°, was about the normal, being only .74 of a degree higher than that for May 1892. The precipitation was above the normal, being 1.12 inches greater than that during the same month last year.

The mean temperature for June, 1893, viz 66.53°, was 2.24 degrees higher than that of June, 1892. The precipitation was about the same, being only .18 of a degree less than that of the same month last year.

The mean temperature of the above two months 1893, was 61.14°, being .75 of a degree less than that for the same period last year.

The frequent showers during the last week in June somewhat retarded the work of haying.

# I.

## ANALYSES OF COMMERCIAL FERTILIZERS COLLECTED DURING 1893, IN THE GENERAL MARKETS BY THE AGENT OF THE MASSACHUSETTS STATE AGRICULTURAL EXPERIMENT STATION.

LABORATORY No.	NAME OF BRAND.	NAME OF MANUFACTURER.	SAMPLED AT
	<i>Compound Fertilizers.</i>		
1	Potato Special.....	Walker Stratman & Co., Pittsburg, Pa.,.....	Amherst.
11	Hampton Lawn Dressing,.....	Bradley Fertilizer Co., Boston, Mass.,.....	Springfield.
17	Ammoniated Bone Superphosphate,.....	Williams & Clark, Boston, Mass.,.....	Springfield.
18	Fish and Potash, (Crossed Fish Brand),.....	Quinnipiac Fertilizer Co., Boston, Mass.,.....	Springfield.
28	Complete Manure for Potatoes, and Root Crops,.....	Prentiss, Brooks & Co., Holyoke, Mass.,.....	Holyoke.
32	Stockbridge Comp. Manure for Potatoes and Vegetables,.....	Bowker Fertilizer Co., Boston, Mass.,.....	Springfield.
34	Fish and Potash (D. Brand),.....	Joseph Church & Co., Tiverton, R. I.,.....	Springfield.
36	Complete Potato Manure,.....	H. J. Baker & Bro., New York, N. Y.,.....	Worcester.
42	Animal Fertilizer,.....	J. G. Jeffords, Worcester, Mass.,.....	Boston.
65	Complete Animal Fertilizer,.....	C. A. Bartlett, Worcester, Mass.,.....	Lowell.
76	English Lawn Dressing,.....	Bradley Fertilizer Co., Boston, Mass.,.....	Lawrence.
77	Bay State Fertilizer,.....	Clark Cove Fertilizer Co., Boston, Mass.,.....	Lawrence.
80	Lawrence Fertilizer,.....	A. Lee & Co., Boston, Mass.,.....	Lowell.
82	Animal Fertilizer,.....	L. B. Darling Fertilizer Co., Pawtucket, R. I.,.....	Lowell.
86	Special Potato Manure,.....	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.,.....	Fitchburg.
90	Ammoniated Bone Superphosphate,.....	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.,.....	Lowell.
98	English Lawn Dressing,.....	Bradley Fertilizer Co., Boston, Mass.,.....	Fitchburg.
129	Ammoniated Bone Superphosphate,.....	Williams & Clark, Boston, Mass.,.....	Dighton.
141	Bay State Fertilizer,.....	Clark Cove Fertilizer Co., Boston, Mass.,.....	Dighton.
147	Fish and Potash (D. Brand),.....	Joseph Church & Co., Tiverton, R. I.,.....	Taunton.
153	Special Potato Manure,.....	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.,.....	Amherst.
157	Ammoniated Bone Superphosphate,.....	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.,.....	Amherst.
199	Special Potato Manure,.....	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.,.....	N. Adams.
201	Potato Special,.....	Walker Stratman & Co., Pittsburg, Pa.,.....	Leeds.
	<i>Bones.</i>		
24	Fine Ground Bone,.....	Gilbert E. Holmes, Worcester, Mass.,.....	Worcester.
83	Ground Bone Meal,.....	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.,.....	Fitchburg.
124	Ground Bone,.....	Hargraves' Manufacturing Co., Fall River, Mass.,.....	Fall River.
127	Fine Ground Bone,.....	Bryant & Brett, New Bedford, Mass.,.....	New Bedford.
128	Pure Bone Meal,.....	Thomas Hersom & Co., New Bedford, Mass.,.....	New Bedford.
154	Ground Bone Meal,.....	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.,.....	Amherst.
215	Fine Ground Bone,.....	Bryant & Brett, New Bedford, Mass.,.....	Amherst.

Laboratory Number.	NAME OF BRAND.	Nitrogen in 100 lbs.		Phosphoric Acid in 100 lbs.						Potassium Oxide in 100 lbs.			
		Moisture.	Found.	Guaranteed.	Total.			Available.	Found.	Guaranteed.			
					Soluble.	Reverted.	Insoluble.				Found.	Guaranteed.	Found.
<i>Compound Fertilizers.</i>													
1-201	Potato Special, .....	11.70	1.72	2.47-3.30	5.12	2.54	5.90	13.56	12-13	7.66	10-11	7.01	5-6
11	Hampden Lawn Dressing, .....	8.16	4.86	3.30-4.12	1.41	3.58	1.92	6.91	7-9	4.99	6-8	3.13	2-3
17-129	Ammoniated Bone Superphosphate, .....	12.98	2.47	2.47-3.30	7.55	2.94	1.28	11.77	10-13	10.49	9-11	2.11	2-3
18	Fish & Potash (Crossed Fish Brand), .....	21.05	4.90	3.30-4.12	2.35	2.55	2.26	7.16	5-8	4.90	3-5	5.60	3-5
28	Comp. Manure for Pot. & Root Crops, .....	9.75	3.30	4.12-4.94	3.97	2.05	3.04	9.06	6-8	6.02	5-6	8.76	8-10
32	Stoekbridge Complete Manure for Potatoes and Vegetables, .....	10.34	3.31	3.25-4.25	4.95	3.15	4.08	12.18	8-10	8.10	7-8	6.97	5-6
34-147	Fish and Potash (D Brand) .....	21.40	2.58	2.47-3.30	2.81	3.43	1.33	7.57	7.5-8.5	6.24	—	1.84	2-3
36	Complete Potato Manure, .....	8.69	3.70	3.30	3.45	2.10	1.84	7.39	5.55	5.55	5-7.5	9.25	10.
42	Animal Fertilizer, .....	10.67	2.25	2.47-3.30	6.04	1.76	8.17	15.97	16-18	7.80	11-13	3.69	2.5-3.5
65	Complete Animal Fertilizer, .....	4.44	3.78	3.30-4.12	.95	6.57	5.17	12.69	16-18	7.52	—	7.12	7-8
76-98	English Lawn Dressing, .....	8.20	4.78	4.95-5.78	1.28	3.66	2.30	7.24	6-8	4.94	5-7	2.86	2.5-3.5*
77-141	Bay State Fertilizer, .....	14.80	2.42	2.47-3.30	6.72	4.16	1.94	12.82	10-14	10.88	9-12	2.28	2-3*
80	Lawrence Fertilizer, .....	12.94	2.63	2.06-2.26	7.16	2.11	1.48	10.75	10-12	9.27	—	2.70	2-3
82	Animal Fertilizer, .....	12.92	2.99	3-4.5	3.48	3.73	1.87	9.08	10-12	7.21	6-8	5.83	4-5
86-153-199	Special Potato Manure, .....	15.12	3.37	3.71-4.57	6.60	1.92	.84	9.36	8-9	8.52	8-9.5	5.51	5.4-6.4*
90-157	Ammoniated Bone Superphosphate, .....	13.47	2.92	2.8-3.7	6.81	2.60	1.59	11.00	10-12	9.41	10-12	1.08	1-2*
<i>Bones.</i>													
24	Fine Ground Bone, .....	9.15	2.90	2.50-3.50	.20	7.90	12.57	20.67	22-24	8.10	—	16.64	10.20
83-154	Ground Bone Meal, .....	13.15	1.21	2-3	.32	10.49	17.00	27.81	25-28	10.81	—	17.57	9.26
124	Ground Bone, .....	13.80	3.52	2.5-2.8	.51	8.19	12.54	21.24	25-27	8.70	—	17.86	43.72
127-215	Fine Ground Bone, .....	7.61	2.78	2.50	.26	8.44	16.50	25.20	25.56	8.70	—	38.43	9.45
128	Pure Bone Meal, .....	4.84	1.75	2.00	.38	10.11	19.57	30.06	29.21	10.49	9.40	74.15	—

**Sulphate of Potash, the source of Potash.**

I. ANALYSES OF COMMERCIAL FERTILIZERS COLLECTED DURING 1893, IN THE  
GENERAL MARKETS BY THE AGENT OF THE MASSACHUSETTS STATE  
AGRICULTURAL EXPERIMENT STATION.

LABORATORY No.	NAME OF BRAND.	NAME OF MANUFACTURER.	SAMPLED AT
	<i>Compound Fertilizers.</i>		
91	Quinnipiac Phosphate, .....	Quinnipiac Fertilizer Co., Boston, Mass.	Fitchburg.
96	Cumberland Superphosphate, .....	Cumberland Bone Co., Portland, Me.,	Lowell.
105	Manure for Light Soils, .....	Mapes Formula & Peruvian Guano Co., New York, N. Y.	Fitchburg.
111	Alkaline Bone, .....	E. Frank Coc., New York, N. Y.	Mansfield.
112	Cleveland Superphosphate, .....	Cleveland Dryer Co., Boston, Mass.,	S. Framingham
118	Eclipse Phosphate, .....	Bradley Fertilizer Co., Boston, Mass.	Palmer.
119	Potato Fertilizer, .....	J. J. H. Gregory & Son, Marblehead, Mass.,	Amherst.
123	Market Garden Manure, .....	Quinnipiac Fertilizer Co., Boston, Mass.	Fall River.
130	Complete Corn Manure, .....	H. J. Baker & Bro., New York, N. Y.	Fall River.
131	Good Brand Excelsior Guano, .....	E. Frank Coc., New York, N. Y.,	Dighton.
136	Potato and Root Crop Manure, .....	L. B. Darling Fertilizer Co., Pawtucket, R. I.,	Fall River.
138	Fish and Potash, .....	W. J. Brightman & Co., Tiverton, R. I.,	Fall River.
140	Nitrogenous Superphosphate, .....	J. C. Dow & Co., Boston, Mass.,	Dighton.
146	High Grade Tobacco Manure, .....	Bradley Fertilizer Co., Boston, Mass.	Greenfield.
169	Standard Phosphate, .....	Read Fertilizer Co., Syracuse, N. Y.,	Pittsfield.
173	Ammoniated Bone Superphosphate, .....	Preston's Fertilizer Co., Greenpoint, L. I.,	Williamstown.
184	Dry Ground Fish, .....	Bradley Fertilizer Co., Boston, Mass.,	Greenfield.
185	Fine Wrapper Tobacco Grower, .....	Williams & Clark, Boston, Mass.,	Greenfield.
190	Standard Potato and Tobacco Fertilizer, .....	Standard Fertilizer Co., Boston, Mass.,	Greenfield.
193	Tobacco Starter, .....	Mapes Formula & Peruvian Guano Co., New York, N. Y.	Greenfield.
195	Potato and Tobacco Fertilizer, .....	Williams & Clark Fertilizer Co., Boston, Mass.	Greenfield.
205	Fish and Potash, .....	National Fertilizer Co., Bridgeport, Ct.,	Hadley.
214	Tobacco Fertilizer, .....	National Fertilizer Co., Bridgeport, Ct.,	Hadley.
216	Potato, Onion and Tobacco Fertilizer, .....	Leander Wilcox, Mystic, Conn.,	Amherst.
217	Ammoniated Bone Superphosphate, .....	Leander Wilcox, Mystic, Conn.,	Amherst.
223	Tobacco Starter, .....	Mapes Formula & Peruvian Guano Co.,	So. Deerfield.
224	Havana Tobacco Fertilizer, .....	Quinnipiac Fertilizer Co., Boston, Mass.,	So. Deerfield.
234	Tobacco Fertilizer, .....	Clark Cove Fertilizer Co., Boston, Mass.,	Agawam.



Laboratory Number.	NAME OF BRAND.	Nitrogen in 100 lbs.			Phosphoric Acid in 100 lbs.						Potassium Oxide in 100 lbs.		
		Moisture.	Found.	Guaranteed.	Soluble.	Reverted.	Insoluble.	Total.		Found.	Guaranteed.		
								Found.	Guaranteed.				
Compound Fertilizers.													
91	Quinnipiac Phosphate, .....	14.41	2.56	3-4	7.14	2.21	1.45	10.80	10-14	9.35	9-12	2.32	2-3*
96	Cumberland Superphosphate, .....	16.43	2.79	2.06-2.88	6.22	2.91	2.43	11.56	10-12	9.13	8-10	2.01	2-3*
105	Manure for light Soils, .....	10.70	4.90	4.04-6.59	5.19	2.77	2.29	10.25	8-10	7.96	6-8	7.38	6-8
111	Alkaline Bone, .....	11.13	1.03	1-1.5	7.42	.58	2.84	10.84	9-12	8.00	7-9	2.59	1.62-2.16*
112	Cleveland Superphosphate, .....	17.77	2.09	2.05-2.85	7.16	2.05	1.51	10.72	11-14	9.21	9-11	3.31	2-3*
118	Eclipse Phosphate, .....	13.60	2.54	1-2	3.27	6.40	1.49	11.16	12-15	9.67	10-12	2.84	1.5-2.5*
119	Potato Fertilizer, .....	7.65	4.09	4.12-4.94	2.70	2.42	2.30	7.42	7	5.12	5-6	12.70	13*
123	Market Garden Manure, .....	12.48	3.08	3.30-4.12	5.28	2.80	.90	8.98	9-13	8.08	8-11	7.13	7-8*
130	Complete Corn Manure, .....	11.31	3.98	3.71	3.43	2.84	1.89	8.16	—	6.27	5	7.10	7.5
131	Gold Brand Excelsior Guano, .....	8.92	2.23	2.5-3.5	6.60	2.00	2.56	11.16	9-13	8.60	8-11	8.21	6-8*
136	Potato and Root Crop Manure, .....	12.00	2.61	3-4	4.71	3.45	5.12	13.28	10-12	8.16	6-8	6.72	7-8
138	Fish and Potash, .....	28.81	3.64	3.71	2.17	2.66	.90	5.73	5-7	4.83	—	5.26	5-6
140	Nitrogenous Superphosphate, .....	16.69	3.11	2.06-2.88	5.76	3.32	1.28	10.36	—	9.08	8-10	3.35	1.89-2.52
166	Bradley's High Grade Tobacco Man.	6.18	5.81	5.77-6.59	1.84	2.41	1.71	5.96	4-5	4.25	—	14.08	10.80-12.42*
169	Standard Phosphate, .....	14.17	1.06	.82-1.65	3.10	6.65	.23	9.98	10-12	9.75	8-10	4.17	4-6*
173	Ammoniated Bone Superphosphate, .....	9.20	3.65	2.47-3.30	1.56	4.58	1.89	8.03	8-11	6.14	—	3.09	2-3
184	Dry Ground Fish, .....	15.63	8.33	7.41-9.06	1.28	2.95	2.04	6.27	7-9	4.23	—	—	—
185	Fine Wrapper Tobacco Grower, ...	6.30	5.84	5.77-6.59	1.41	2.82	2.81	7.04	6-9	4.23	5-7	9.96	10-12
190	Standard Potato and Tobacco Fert.	13.86	1.83	2.05-2.88	7.01	1.33	2.42	10.76	9-13	8.34	—	3.69	3-4
193-223	Tobacco Starter, .....	10.35	2.85	2.47-3.30	6.42	2.46	4.22	13.10	12-16	8.88	—	3.90	2.5-3.5
195	Potato and Tobacco Fertilizer, .....	12.45	3.66	4.5-5	7.09	.94	.59	8.62	8-11	8.03	7-9	7.83	7-9
205	Fish and Potash, .....	7.48	2.91	3.30-4.12	2.15	2.00	3.63	7.78	6-8	4.15	—	5.64	5-6
214	Tobacco Fertilizer, .....	11.32	4.53	3.30-4.94	7.65	1.14	.60	9.39	10-12	8.79	8-10	5.07	5.40-6.48*
216	Potato, Onion and Tobacco Manure,	14.44	3.35	3.25-4.25	4.86	2.20	1.79	8.85	8-9	7.06	7-8	6.72	6-7
217	Ammoniated Bone Superphosphate,	15.53	2.87	2.5-3.5	3.74	2.43	1.74	7.91	7-8	6.17	6-7	5.72	5-6
224	Havanna Tobacco Fertilizer, .....	6.10	6.16	5.77-6.59	1.70	2.27	2.49	6.46	6-9	3.97	5-7	6.68	10-12*
234	Tobacco Fertilizer, .....	5.60	6.38	5.77-6.59	1.41	2.94	3.45	7.80	—	4.35	5-7	10.37	10-12

\*Sulphate of Potash, the source of Potash.

## II.

ANALYSES OF COMMERCIAL FERTILIZERS AND MAN-  
URIAL SUBSTANCES SENT ON FOR  
EXAMINATION.

- 871—875.** I. Boiler soot. Sent on from Hatfield, Mass.  
II. Mill sweepings. Sent on from Westboro', Mass.  
III. Saltpetre. Sent on from S. Acton, Mass.  
IV. Horse manure. Sent on from Westboro', Mass.  
V. Sewage. Sent on from Danvers, Mass.

	<i>I.</i>	<i>II.</i>	<i>III.</i>	<i>IV.</i>	<i>V.</i>
Moisture at 100° C.,	18.80	9.49	.66	11.25	99.959
Phosphoric acid,	1.60	1.18	—	1.46	.0012
Potassium oxide,	.54	.66	45.74	2.82	.0033
Calcium oxide,	2.31	—	—	—	—
Magnesium oxide,	1.19	—	—	—	—
Nitrogen,	—	3.76	11.88	.74	.0028
Insoluble matter,	58.91	5.01	—	12.60	—

- 876—880.** I and II. Ground bone. Sent on from Concord, Mass.  
III. Natural phosphate. Sent on from Ashby, Mass.  
IV. Cotton hull ashes. Sent on from Agawam, Mass.  
V. Cotton hull ashes. Sent on from Boston, Mass.

	<i>I.</i>	<i>II.</i>	<i>III.</i>	<i>IV.</i>	<i>V.</i>
Moisture at 100° C.,	9.23	8.71	3.58	13.92	7.77
Total phosphoric acid,	21.80	20.29	.23	9.21	7.83
Soluble “ “	None	None	—	—	—
Reverted “ “	12.96	10.20	—	—	—
Insoluble “ “	8.84	10.09	—	—	—
Potassium oxide,	—	—	—	24.12	20.40
Nitrogen,	3.54	3.70	—	—	—
Insoluble matter,	—	—	77.04	9.33	11.78

**881—885.** WOOD ASHES.

- I. Sent on from Tewksbury, Mass.  
II and III. Sent on from Concord, Mass.  
IV and V. Sent on from North Amherst, Mass.

	<i>I.</i>	<i>II.</i>	<i>III.</i>	<i>IV.</i>	<i>V.</i>
Moisture at 100° C.,	11.30	15.01	8.49	18.13	14.25
Potassium oxide,	6.80	8.05	7.10	5.05	5.95
Phosphoric acid,	1.69	.67	.31	.92	1.43
Insoluble matter(before calcination),	16.56	18.38	16.97	15.33	15.03
Insoluble matter(after calcination),	13.66	15.84	15.25	13.46	12.75

## III.

ANALYSES OF FODDER ARTICLES SENT ON FOR  
EXAMINATION.

I. Gluten feed. Sent on from Marlboro, Mass.

II. Proteina. Sent on from North Amherst, Mass.

III. Proteina. Sent on from Weston, Mass.

	<i>I.</i>	<i>II.</i>	<i>III.</i>
Moisture at 100. C.,	7.64	8.04	6.80
Dry matter,	92.36	91.96	93.20
	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00

## ANALYSIS OF DRY MATTER.

Crude ash,	1.14	2.80	3.24
Crude cellulose,	5.78	12.33	10.18
Crude fat,	9.18	7.74	8.24
Crude protein,	21.11	24.47	27.23
Non-nitrogenous extract matter,	62.79	52.66	51.11
	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00

I. Pea bran. Sent on from Great Barrington, Mass.

II. Corn ensilage. Sent on from Marlboro', Mass.

III. Oat and pea ensilage. Sent on from Marlboro', Mass.

IV. Cotton hulls. Sent on from Boston, Mass.

	<i>I.</i>	<i>II.</i>	<i>III.</i>	<i>IV.</i>
Moisture at 100° C.,	7.14	79.98	38.02	8.15
Dry matter,	92.86	20.02	61.98	91.85
	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00

## ANALYSIS OF DRY MATTER.

Crude ash,	3.33	5.50	9.19	2.81
Crude cellulose,	46.16	25.24	31.34	46.60
Crude fat,	1.16	4.20	3.94	1.79
Crude protein,	10.31	8.22	13.72	4.10
Non-nitrogenous extract matter,	39.04	57.84	41.81	44.70
	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00

I. Dried brewers' grain. Sent on from Boston, Mass.

II and III. Gluten feed. Sent on from Amherst, Mass.

IV. Gluten meal. Sent on from Boston, Mass.

V. Old process linseed meal. Sent on from North Amherst.

	<i>I.</i>	<i>II.</i>	<i>III.</i>	<i>IV.</i>	<i>V.</i>
Moisture at 100° C.,	7.99	8.99	8.06	6.15	10.19
Crude fat,	5.56	7.01	6.96	15.51	2.60
Crude protein,	17.25	24.88	25.00	27.63	34.88

TRADE VALUES  
OF FERTILIZING INGREDIENTS IN RAW MATERIALS  
AND CHEMICALS.

	1893. <i>Cents per pound.</i>
Nitrogen in ammonia salts,	17
“ “ nitrates,	15½
Organic nitrogen in dry and fine ground fish, meat, blood, and in high-grade mixed fertilizers,	17½
“ “ “ cotton-seed meal, linseed meal and castor pomace,	16½
“ “ “ fine ground bone and tankage,	15
“ “ “ fine ground medium bone and tankage,	12
“ “ “ medium bone and tankage,	9
“ “ “ coarse bone and tankage,	7
“ “ “ hair, horn-shavings and coarse fish scraps,	7
Phosphoric acid soluble in water,	6½
“ “ soluble in ammonium citrate,	6
“ “ in fine bone and tankage,	6
“ “ in fine medium bone and tankage,	5
“ “ in medium bone and tankage,	4
“ “ in coarse bone and tankage,	3
“ “ in fine ground fish, cotton-seed meal, linseed meal, castor pomace and wood ashes,	5
“ “ insoluble (in am. cit.) in mixed fertilizers,	2
Potash as High Grade Sulphate, and in mixtures free from Muriate,	5½
“ “ Muriate,	4½
The manurial constituents contained in feedstuffs are valued as follows :	
Organic Nitrogen,	17½
Phosphoric acid,	5
Potash,	5½ .

*The Bulletins of the Mass. Experiment Station will be sent free of charge to all parties interested in its work, on application.*

C. A. GOESSMANN, *Director.*

Amherst, Mass., June 30, 1893.

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